

## Research Article

# Effect of Magnesium Administration on Passive Avoidance Memory and Formalin-Induced Nociception in Diabetic Rats

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## Abstract

**Purpose:** To investigate the effect of oral consumption of magnesium on the memory and pain sensation of diabetic rats.

**Methods:** A total of 48 rats were divided into four groups - untreated control, untreated diabetic, magnesium-treated control and magnesium-treated diabetic. Plasma magnesium and glucose concentrations were measured after induction of diabetes with streptozotocin (STZ; 60 mg/kg). Four weeks after the administration of oral magnesium (10 g/L, MgSO<sub>4</sub>), the animals were subjected to passive avoidance test whereby latency time (LT) was assessed. This was followed by formalin test which entailed the determination of licking and flinching scores

**Results:** Increased level of glucose and decreased concentration of magnesium in untreated diabetic group compared to untreated control group ( $p < 0.001$ ) were observed. There was also a significant reduction in mean LT of untreated diabetic group ( $p < 0.001$ ) as indicated by the increased number of animals that entered the dark compartment. Plasma glucose and magnesium levels in magnesium treated diabetic rats returned to normal 4 weeks after oral magnesium consumption. There was no significant change in mean total pain score despite elevated licking in diabetic animals after oral magnesium consumption. Significant elevation of flinching scores of untreated diabetic rats was observed in the last 20 min of the 2nd chronic phase, compared with the untreated control group. **Conclusion:** It seems that magnesium treatment either restores rat memory performance that is impaired by diabetes or that it affects the aversive responses evoked by electrical shock.

**Keywords:** Diabetes, Magnesium, Glucose, Passive avoidance memory, Formalin test.

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